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ABSTRACT

The purposes of this study were (1) to determine the factor structure of the Teacher Temperament Questionnaire (TTQ); and (2) to use this questionnaire as an instrument to determine if the factor structure of the TTQ corresponded to the New York Longitudinal Study (NYLS) temperament qualities. The TTQ, consisting of 64 behavioral items, measures teachers' perceptions of the child's characteristic style of interacting with the school environment. For each of the eight NYLS temperament qualities there were eight TTQ items. Forty preschool and kindergarten teachers completed the TTQ for each child in their classrooms. Three hundred and sixty-six children were rated. Results clearly indicated overlap between the NYLS qualities and the TTQ on five of the eight factors: Focused-Distractive, Outgoing-Reserved, Placid-Assertive, Energetic-Quiet, and Responsive-Unresponsive. Correlations between the five factors and age and sex indicated that while sex was not significantly related to any of the five factors, older children were significantly more focused, less responsive, and less placid. (Author/MP)

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Dimensions of Child Temperament in School Settings

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Dimensions of Child Temperament in School Settings

Thomas and Chess (1977) have defined temperament as the "how" of a child's behavior, as opposed to the "what" which refers to ability, or the "why" which refers to motivation. As part of the New York Longitudinal Study (NYLS), their group had identified and studied nine dimensions of temperament (Thomas, Chess, Birch, Hertzig, & Korn, 1963): Mood, Activity, Threshold, Approach-withdrawal, Persistence, Intensity, Adaptability, Distractibility, and Rhythmicity (see Table 1).

Recently, Thomas and Chess (1977) have extended eight of their nine qualities (Rhythmicity is omitted) into the school setting with the development of the Teacher Temperament Questionnaire (TTQ). At present no data on the factorial structure of this questionnaire have been reported. It is both theoretically and methodologically important to establish empirically whether the temperament dimensions measured by the TTQ in the school setting are the eight qualities it was designed to measure. There are several reasons why such might not be the case.

First, temperament data obtained from school settings may suggest a different organization of temperament behavior than that formulated by the NYLS group. The original nine NYLS qualities were based upon parent interviews and behavioral observations of children in their homes. Interaction between the child and the school environment may elicit a different structure of temperament dimensions (a possibility noted by Thomas & Chess, 1977).

Second, temperament behavior may have a significant developmental component. The NYLS temperament qualities grew out of work with very young children (under two and one-half years) and their parents. These nine NYLS qualities may in fact be of great importance across situations during infancy but other qualities may become important as a child matures.

As a child grows older, the environment makes more frequent and extensive demands for various forms of self-regulation. Rothbart and Derryberry (in press) have theorized that the interplay between reactive and regulatory processes leads to changes in temperament over time. Thus, due to the increased environmental pressures to regulate reactive tendencies, temperament items may combine in ways which suggest somewhat different temperament dimensions.

Our final criticism is methodological. The NYLS qualities were identified by means of an "inductive content analysis" of the parent "interview protocols of the first twenty-two children studied" (Thomas et al., 1963, p. 40). They have not confirmed this dimensional structure by means of factor analysis. What little evidence is available suggests that the factor structure of child temperament during the preschool years may be somewhat simpler than that suggested by the NYLS group. There have been no attempts to replicate in the school setting the NYLS factor structure.

In summary, the Teacher Temperament Questionnaire (Thomas & Chess, 1977), has been developed as an instrument designed to measure eight specific temperament qualities in the school setting with three to seven year old children. Because the eight qualities were originally identified through the study of infants in the home and were not empirically validated, the goal of the present study was to determine the factor structure of the Teacher Temperament Questionnaire, and to determine if the factor structure corresponded to the NYLS temperament qualities the questionnaire was designed to measure.

Method

Three hundred sixty-six preschool and kindergarten children, from

several school systems in a large metropolitan area, participated in the study. Forty teachers completed the Teacher Temperament Questionnaire for each child. The socio-economic status of the group was predominantly middle class and they were predominantly of white ethnic background.

The Teacher Temperament Questionnaire (Thomas & Chess, 1977) consists of 64 specific behavioral items, each of which is rated on a 7-point scale from "hardly ever" to "almost always." The questionnaire measures teachers' perceptions of the child's characteristic style of interacting with the school environment. There are eight items for each of the eight NYLS temperament qualities.

Results

Five factors were identified which accounted for 84% of the common variance and 53% of the total variance. The Focused-distracted factor included items which indicated a self-directed attention to school tasks. The Outgoing-reserved factor had high loadings on items indicating the child's tendency to seek out and enjoy people and school demands. The items which had high loadings on the Placid-assertive factor described a child's manner of reacting to social conflict and personal frustration. Energetic-quiet items reflected a child's characteristic level of activity. Responsive-unresponsive items indicated a child's awareness of environmental stimulation and communication of that awareness to others. (See Table 2 for the items assigned to each factor.)

Overlap between the NYLS qualities and our factors is suggested by Table 3, which indicates the number of items, of the eight designed to measure each NYLS temperament quality, which loaded with a factor loading of $\pm$ .40 or higher on one of our dimensions. The NYLS Activity quality clearly corresponds to our Energetic-quiet factor; their Threshold to

our Responsive-unresponsive factor. Six items of the NYLS Persistence quality load on the Focused factor; seven items of the NYLS Approach quality load on the Outgoing factor. However, both of these factors, and the Placid factor, also have high loadings for items which are drawn from several NYLS qualities. For example, the Focused-distracted factor includes six (of the eight) items from Persistence, four from Distractibility, three from Activity, two from Adaptability, and one from Mood.

Factor scores were created by adding together items which loaded on a factor at $\pm$ .40 or higher. Internal consistencies for these five simple sum factor scores, as measured by Cronbach's alpha, ranged from .78 (Responsive) to .95 (Focused), with a median alpha of .87. Intercorrelations presented in Table 2 indicate that the five factors are relatively independent, with the greatest relationship being a shared variance of .25 between the Outgoing and Energetic factors.

Correlations between the five factors and age and sex indicated that sex was not significantly related to any of the five factors. Relationships between age and the factors were small, with older children being significantly more focused, less placid, and less responsive.

Discussion

A number of studies have tested the factor structure of temperament based upon parent report of preschooler's behavior in the home setting (Garside, Birch, Scott, Chambers, Kolvin, Tweddle, & Barber, 1975; Lambert & Windmiller, 1977; Rowe & Plomin, 1977). They found dimensions similar to three of the five factors derived from teacher ratings of temperament in the present study.

The Focused factor corresponds to the attention span/persistence factors found in these other three studies. The Outgoing factor is similar

to approach/withdrawal or sociability factors, and the Energetic factor corresponds to activity factors. Since each study used somewhat different items, it is unclear if these factors correspond exactly. However, they are suggestive of the possibility of general temperament dimensions which may cut across situations or environments during the preschool age period.

Neither the studies of the factor structure of preschoolers' temperament in the home setting, nor the present one in the school setting replicated all eight of the NYLS temperament qualities. Our findings and those of others are consistent in indicating that fewer than eight dimensions better reflect the structure of the commonality among items designed to measure the NYLS qualities.

A recently developed theoretical perspective may help to understand the temperament factors we have identified. Rothbart and Derryberry (in press) have theorized that temperament behavior may be a function of the interplay between reactive and regulatory processes. The reactive process is primary. The regulatory process is viewed as one which develops through maturation and which may lead to changes in the manner in which the reactive component is manifested. Thus, their theory suggests that reactive expression changes as a function of regulatory development. Regulation may be prompted by either internal needs or demands (e.g., too much stimulation may be painful) or external needs or demands (e.g., in school a child must sit still).

The Rothbart and Derryberry theory suggests that temperament behavior may change as a function of both new demands and new skills. Our school factors may reflect the influences of both. For example, success in the school setting is highly influenced by the child's ability to attend to school tasks. Items which loaded on the Focused factor shared a common

dimension of reflecting the child's ability to meet demands for self-regulation. For example, four items of Distractibility load on our Focused factor, and two on our Placid factor. An examination of these items suggests that those which loaded on the Focused factor had to do with self-control (e.g., "This child cannot be side-tracked when he/she is working"), while those which loaded on the Placid factor had to do with soothability.

In the original NYLS scheme, Distractibility was viewed as a quality making an infant easier to soothe, and therefore of positive adaptive significance. They acknowledged, however, that later demands for self-control might lead a child who continued to be distractible into adaptive difficulties (Thomas & Chess, 1977). In effect, changing demands of the environment might continue to value soothability but would also begin to expect self-control as well.

The Focused factor might be seen as a temperament dimension which emphasizes self-control and hence is dominated by a self-regulatory process. This may be true for some children: for example, a child with a high Energy and a high Focused score. But for other children, those who are relatively quiet to begin with, the Focused factor may reflect very little self-control and may essentially be a manifestation of their low reactivity. Thus, while some qualities may be due to development of self-regulation, it is difficult to say that self-regulation dominates or is primarily responsible for a particular pattern of behavior.

Generally, we expect that the mix of temperament and personality becomes more complex with age. Coping styles (as a reflection of self-regulatory mechanisms) are a function of a child's skill level, environmental demands, and the reactive qualities which they, in part, must

modulate. As a child grows older, it becomes increasingly difficult to separate the purely reactive from the purely regulatory, or even to assign them weights. Both give shape to personality.

Future study might compare the relationship of home derived factors with those derived from schools. Our findings suggest that the factors will be similar, but the level of behavior of a particular child on a particular dimension may vary dramatically between home and school. Finally, the relationship to adaptation in the school environment remains an important area in need of greater work.

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Table 1

Thomas and Chess' (1977) Definitions of
Nine Temperament Qualities

(1) Activity Level: the motor component present in a given child's functioning and the diurnal proportion of active and inactive periods. Protocol data on motility during bathing, eating, playing, dressing, and handling, as well as information concerning the sleep-wake cycle, reaching, crawling, and walking, are used in scoring this category.

(2) Rhythmicity (Regularity): the predictability and/or unpredictability in time of any function. It can be analyzed in relation to the sleep-wake cycle, hunger, feeding pattern, and elimination schedule.

(3) Approach or Withdrawal: the nature of the initial response to a new stimulus, be it a new food, new toy or new person. Approach responses are positive, whether displayed by mood expression (smiling, verbalizations, etc.) or motor activity (swallowing a new food, reaching for a new toy, active play, etc.). Withdrawal reactions are negative, whether displayed by mood expression (crying, fussing, grimacing, verbalizations, etc.) or motor activity (moving away, spitting new food out, pushing new toy away, etc.).

(4) Adaptability: responses to new or altered situations. One is not concerned with the nature of the initial responses, but with the ease with which they are modified in desired directions.

(5) Threshold of Responsiveness: the intensity level of stimulation that is necessary to evoke a discernible response, irrespective of the specific form that the response may take, or the sensory modality affected. The behaviors utilized are those concerning reactions to sensory stimuli, environmental objects, and social contacts.

(6) Intensity of Reaction: the energy level of response, irrespective of its quality or direction.

(7) Quality of Mood: the amount of pleasant, joyful and friendly behavior, as contrasted with unpleasant, crying, and unfriendly behavior.

(8) Distractibility: the effectiveness of extraneous environmental stimuli in interfering with or in altering the direction of the ongoing behavior.

(9) Attention Span and Persistence: two categories which are related. Attention span concerns the length of time a particular activity is pursued by the child. Persistence refers to the continuation of an activity in the face of obstacles to the maintenance of the activity direction.

Table 2

NYLS Teacher Temperament Questionnaire Items Assigned to School Factors[a]

School Temperament Factor	TTQ Temperament Quality	TTQ Item
Focused-Distracted	Persistence	If child's activity is interrupted, he/she tries to go back to the activity.
		Child can continue at the same activity for an hour.
		When assistance is offered in doing a task, child prefers to do it on his/her own.
		Child quickly becomes impatient with a task he/she cannot grasp, and goes on to something else.(-)[b]
		Child starts an activity and does not finish it.(-)
		During free play, child will stick to any one activity for only a short time.(-)
	Distractibility	Child cannot be distracted when he/she is working (seems to concentrate in the midst of bedlam).
		If other children are talking or making noise while teacher is explaining a lesson, this child remains attentive to the teacher.
		Child is easily drawn away from his/her work by noises, something outside the window, another child's whispering, etc.(-)
		This child is easily sidetracked.(-)
	Activity	Child is able to sit quietly for a reasonable amount of time (as compared to classmates).
		Child sits still when a story is being told or read.
		Child seems to have difficulty sitting still, may wriggle a lot or get out of seat.(-)
	Adaptability	When teacher establishes safety rule (such as behavior during fire drill), child learns to obey quickly.
		After an absence of many days or after a long holiday, it takes time for this child to re-adjust to school routine. (-)
	Mood	Child enjoys listening to stories.
Outgoing-Reserved	Approach	Child gets involved immediately in new learning situations.
		Child plunges into new activities and situations without hesitation.
		Child will get up and perform before the class (sing, recite, etc.) with no hesitation, even the first time.
		When given a new school assignment, child responds with immediate interest.
		Child is shy with adults he/she doesn't know.(-)
		Child will initially avoid new games and activities, preferring to sit on the side and watch.(-)
		Child is bashful when meeting new children.(-)
	Adaptability	If initially hesitant about entering into new games and activities, child gets over this quickly.
		Child takes a long time to become comfortable in a new physical location (e.g., different classroom, new seat, etc.).(-)
		Child takes a long time to become comfortable in a new situation.(-)
		Child adjusts to changes in school routine, rules or procedures, only after a long time.(-)

School Temperament Factor	TTO Temperament Quality	TTO Item
Outgoing-Reserved (Cont'd)	Mood	When with other children, this child seems to be having a good time.
		Child smiles, laughs.
	Intensity	When telling a story, such as what happened on the weekend or during a vacation, the child talks about it loudly, with enthusiasm and excitement.
		It is hard to tell what this child is feeling (either positive or negative) as there is little change in facial expression.(-)
Placid-Assertive	Mood	When playing with other children, this child argues with them.(-)
		Child becomes easily upset when he/she loses a game.(-)
		Child complains to teacher about other children.(-)
		When child can't have or do something he/she wants, child becomes annoyed or upset.(-)
	Intensity	Child will show little or no reaction when another child takes his/her toy or possession away.
		When child loses a game, he/she takes it lightly.
		Child overreacts (becomes very upset) in a stressful situation.(-)
		Child lets other children know when he/she does not like something by yelling or fighting.(-)
	Adaptability	If he/she initially does not get along well with another child, this child's relationship with them improves quickly.
		Child will adjust quickly to a game if others want to play in a different way.
	Distractibility	If child is in a bad mood, he/she can easily be "joked" out of it.
		If another child has a toy he/she wants, this child will easily accept a substitute.
Energetic-Quiet	Activity	Child runs rather than walks.
		In outdoor play, child is active and energetic, rough and tumble, compared to other children.
		If recess must be skipped so child doesn't have usual physical outlet, he/she becomes restless.
		Child's movements are slow.(-)
		During free play time, child prefers quiet activites (such as reading or coloring) over play involving more movement (such as ball, jump-rope, tag, etc.).(-)
	Intensity	Child's responses are loud.
Responsive-Unresponsive	Threshold	Child is very conscious of odors, comments on pleasant or unpleasant smells.
		Child remarks if teacher or classmates wear new clothes.
		Child is sensitive to temperature and likely to comment on classroom being hot or cold.
		Child is highly sensitive to changes in the brightness or dimness of light.
		Child does not notice colors, and does not comment on how pretty or ugly they are.(-)
	Persistence	When class is promised something in the future (trip, party, etc.), this child keeps reminding the teacher of it.

School Temperament Factor	TTO Temperament Quality	TTO Item
Items Dropped[c]	Threshold	Child has to be seriously hurt before he/she comments or cries about cuts or bruises.
		Child doesn't react if accidently touched or lightly brushed by another child.
		Child is not bothered by loud noises (for example, fire alarm, siren, etc.).
	Distractibility	If another child tries to interrupt when this child is engaged in an activity, he/she will ignore them.
		Teacher may have to speak to child several times before child hears or responds if he/she is engaged in a task.
	Mood	Child enjoys going on errands for the teacher.
	Approach	Child prefers familiar toys and games to new play equipment.
	Persistence	If teacher is busy when child wants teachers attention, child goes away instead of keeping after teacher.
	Intensity	Child seems to take things matter-of-factly (such as a visitor to class, trips or other special events), without getting very excited.

[a]Factor loading of ± .40 or higher.

[b]Each scale is based on the average of eight individual items.

[c]Items loading at less than ± .40 were not assigned to any factor.

Table 3

Number of Thomas and Chess Temperament Scale Items Loading on School Factors[a]

Temperament Scales[b]	School Factors					Items Dropped[c]
	Focused	Outgoing	Placid	Energetic	Responsive	
Mood	1	2	4			1
Activity	3			5		0
Threshold					5	3
Approach		7				1
Persistence	6				1	1
Intensity		2	4	1		1
Adaptability	2	4	2			0
Distractibility	4		2			2

[a] Factor loading of $\pm$ .40 or higher.

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Table 3

Number of Thomas and Chess Temperament Scale Items Loading on School Factors[a]

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Activity	3			5		0
Threshold					5	3
Approach		7				1
Persistence	6				1	1
Intensity		2	4	1		1
Adaptability	2	4	2			0
Distractibility	4		2			2

[a]Factor loading of $\pm$ .40 or higher.

[b]Each scale is based on the average of eight individual items.

[c]Items loading at less than $\pm$ .40 were not assigned to any factor.